

SIMPLE
CITY
STUDIO

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JUST BIG ENOUGH
GREEN HOUSING FOR ALL

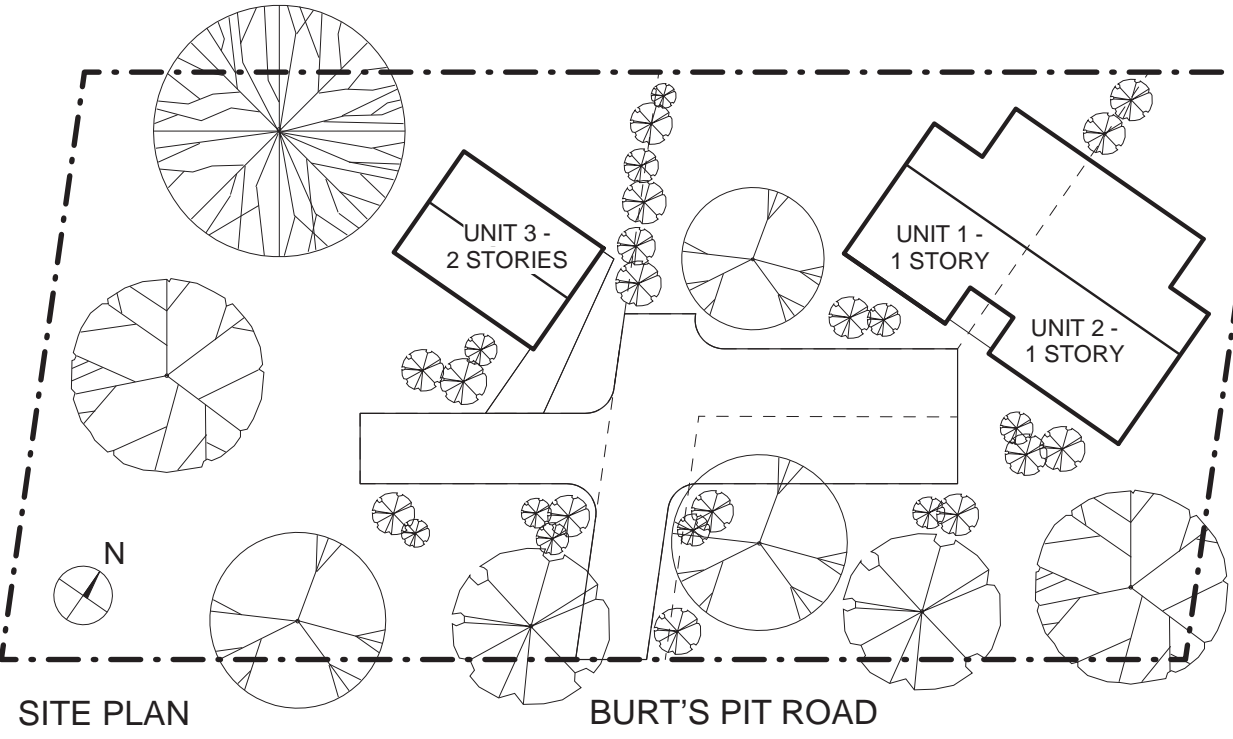
SHIFT

FORM / SCALE / PERCEPTION

Shift Homes are driven by simplicity. Their forms emerge from small strategic moves that respond to climate, site and the inhabitants. The burden of excess is eliminated by smaller, smarter, more space efficient design, reducing environmental impact and making room to interact with our environments in rejuvenating ways. Living small is the most sustainable way to live. The homes are built from natural, non-toxic, non-petroleum based components, making them more healthy and beautiful. These Homes help shift the mentality towards small living, which goes hand in hand with energy efficiency and sustainability. Burt's Pit Road and Florence are characterized by smaller, modest homes. With a mix of styles from the single story Cape, the deck houses, to the Craftsman, and some modern and contemporary. Shift Homes take on classic forms, but are detailed and clad in a contemporary, minimalist style.

DESIGNING FOR HABITAT FOR HUMANITY

Pioneer Valley Habitat for Humanity's mission of opportunity, inclusiveness and innovation is an inspiration for the movement of small living. Good sustainable design is not out of reach, and must be available to all. Shift Homes are designed with Habitat's approach in mind. The Design is accessible and easily replicated but still flexible, so it can stay contextual to its location and fitting to its user. It implements many money-saving design strategies to make the homes as affordable as possible, while still making a Net-Positive energy building. Details and building methods are kept simple and straightforward so homes can be constructed with the help of unskilled or low-skilled volunteer labor. Implementing Passive House strategies helps keep the homeowners warm and healthy with reduced mechanical systems, making the buildings and inhabitants more independent.



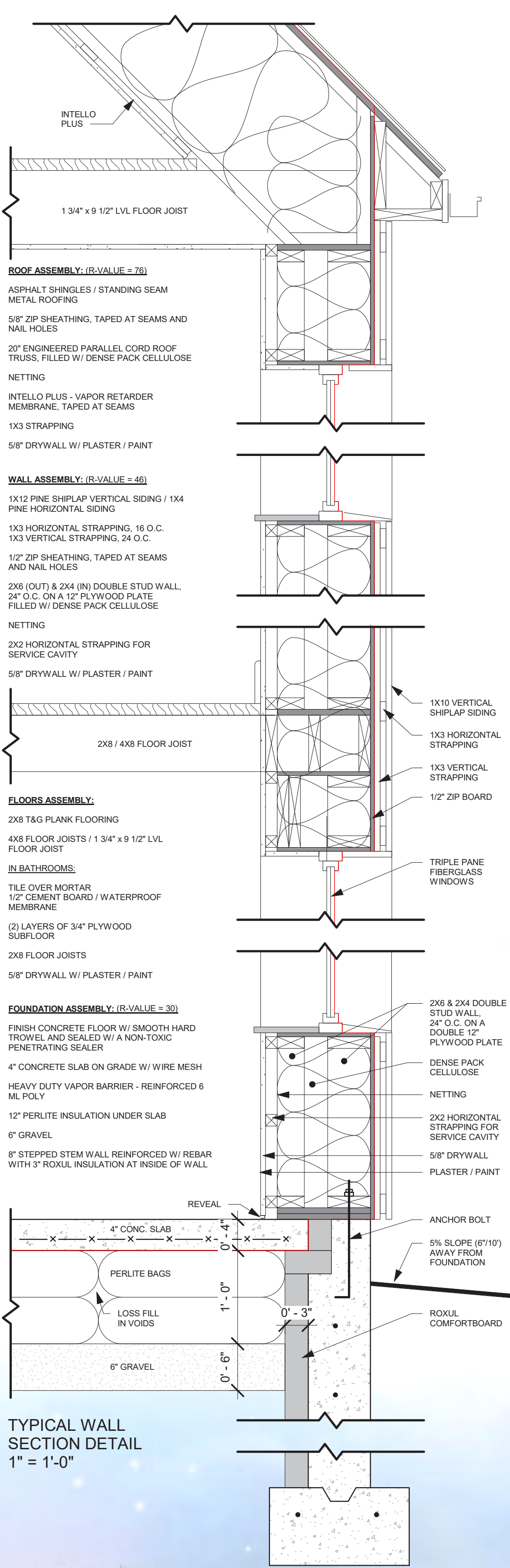
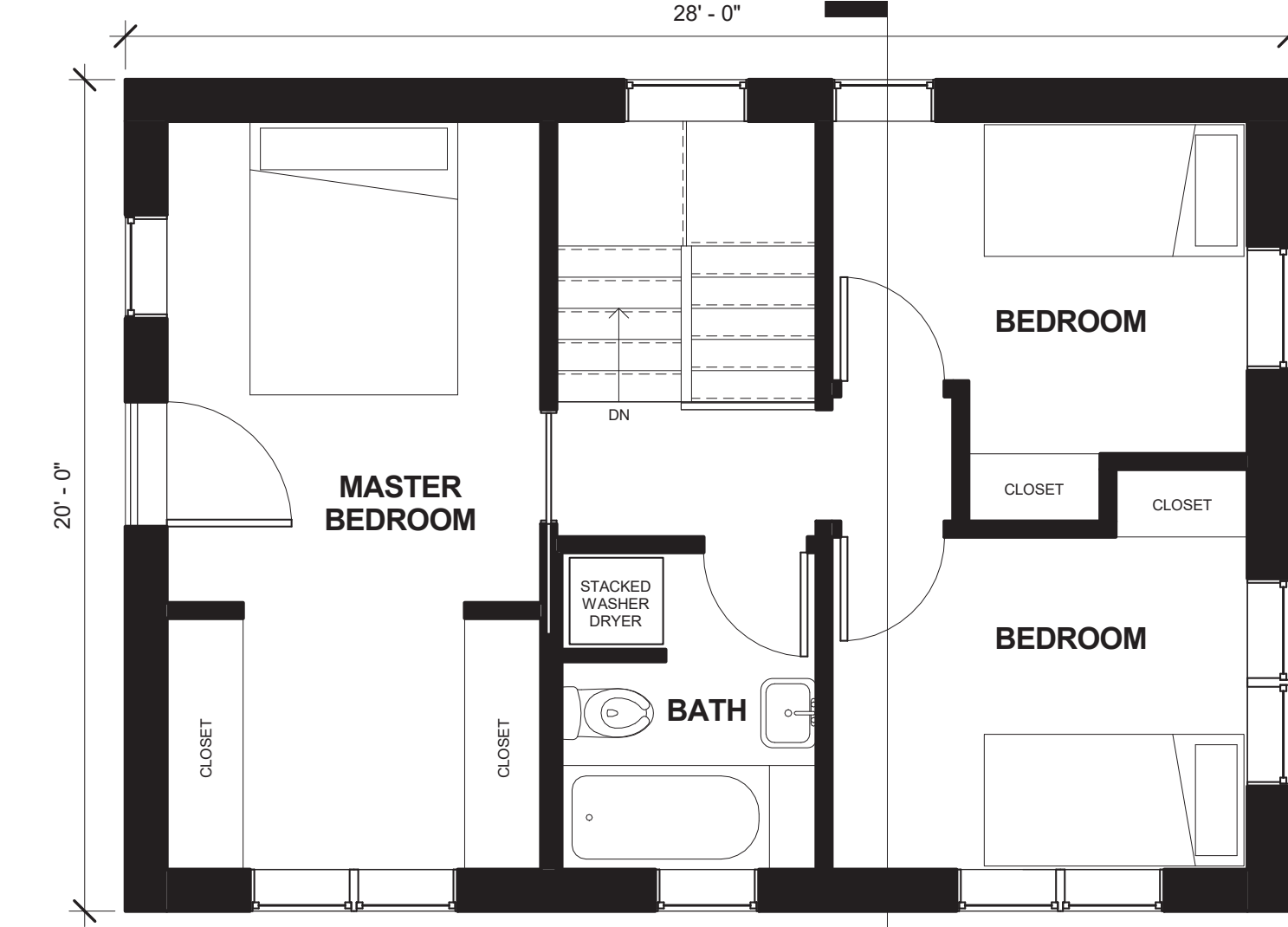
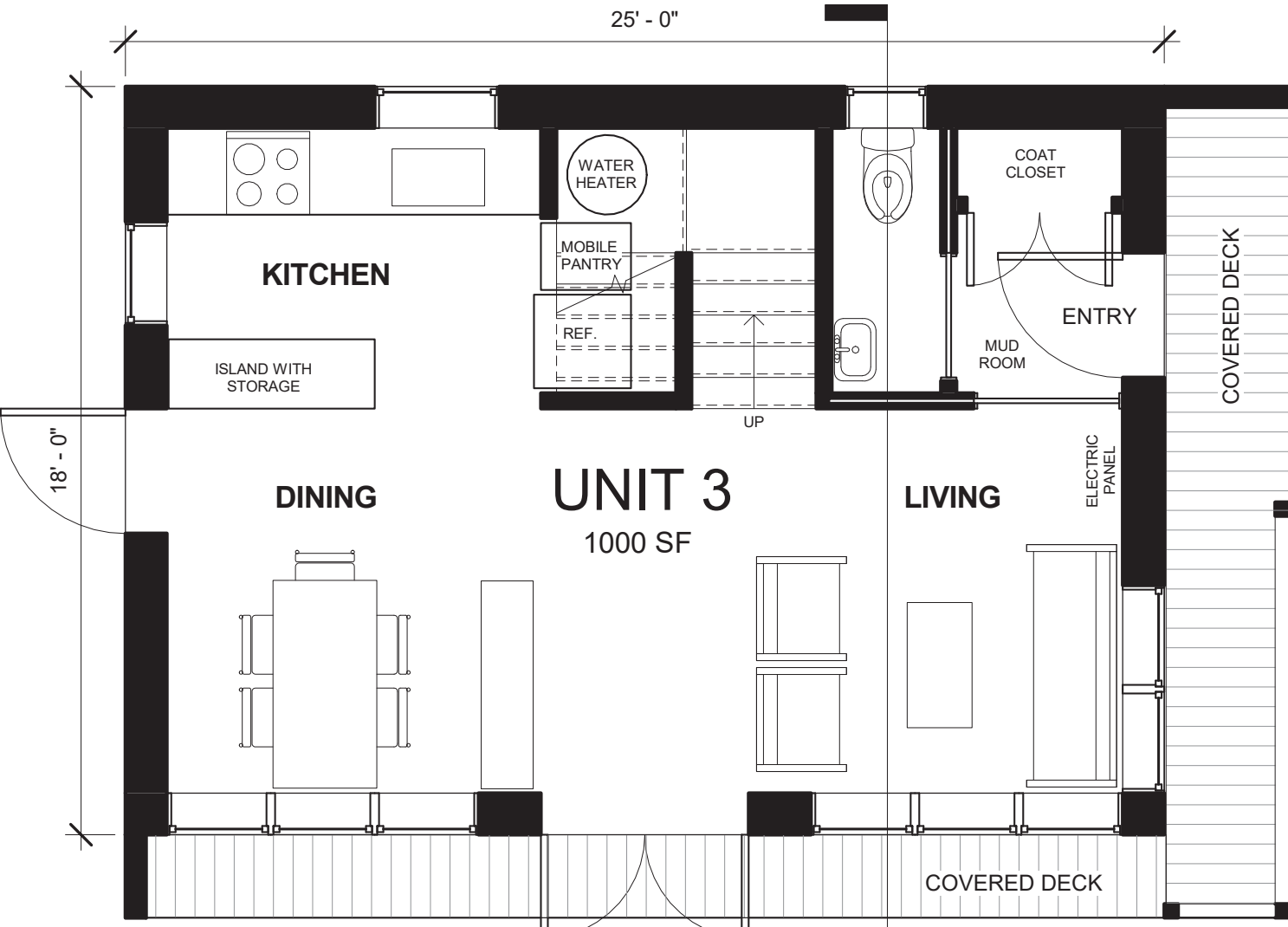
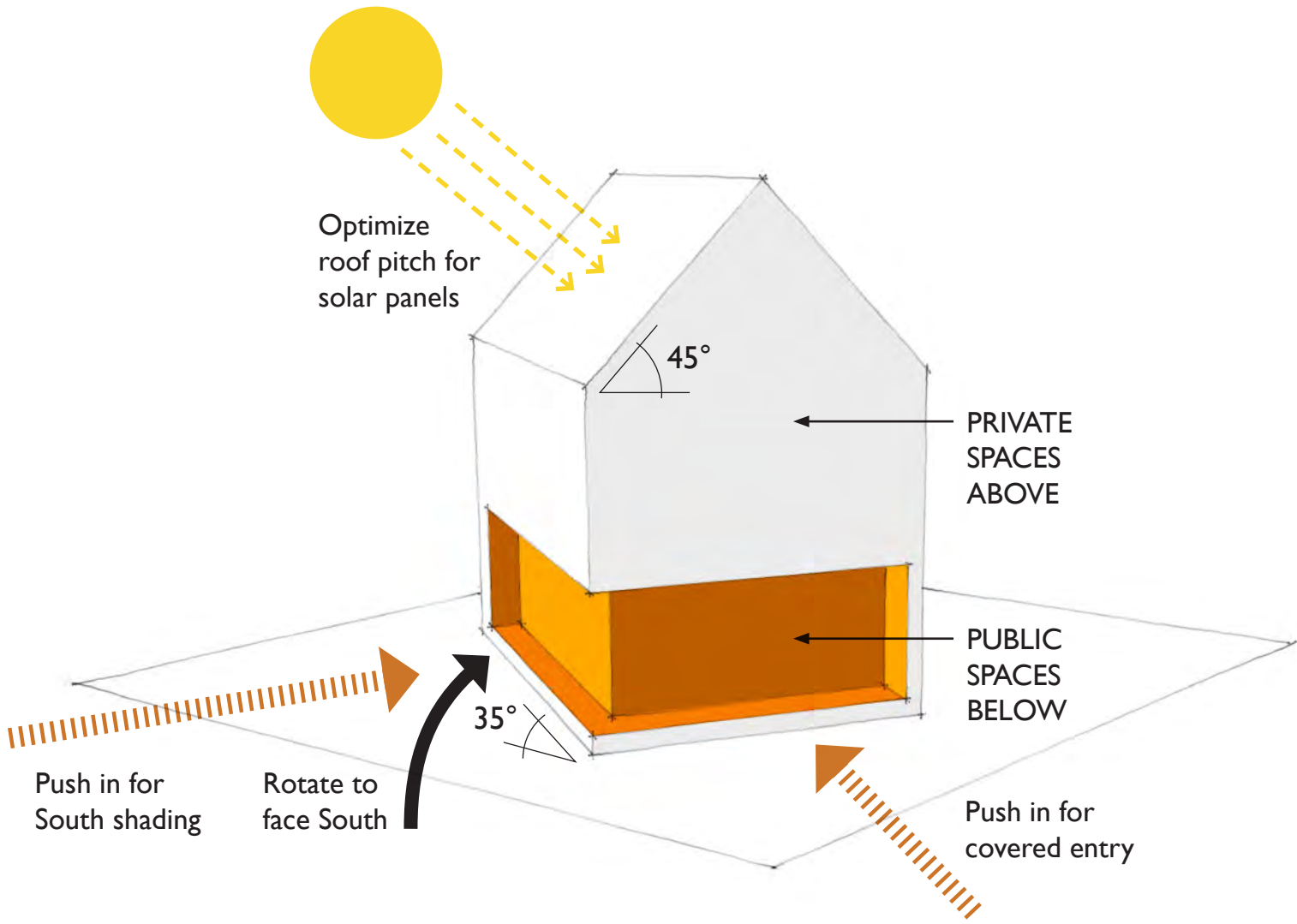
MONEY-SAVING
DESIGN STRATEGIES

- Simple forms**
Rectangular forms without special features and a single gable roof are easier, faster and cheaper to build, but also perform better.
- Keeping it small**
Smart layouts and space efficiency minimize circulation and maximize the most lived-in spaces, allowing us to build smaller and save on costs.
- Advanced framing**
Faster build, uses less wood and allows for more insulation in the wall. Windows can also be sized to fit exactly between 24" o.c. studs, to reduce framing further.
- Standard components**
Sizing the building to be built with standard sized building components and using standard size windows and doors.
- Centralized utilities**
Running less plumbing piping and ventilation air ducts saves time and money.
- Cellulose insulation**
Most affordable and sustainable insulation option, and can be blown-in by the builder.
- Vaulted ceiling with loft**
Extra usable space above that requires little extra work.
- Recycled materials**
Recycled wood, siding, flooring, finishes and more can be used to save money.
- Building up**
Saving on the cost of the foundation and roof by building two stories.
- No basement or garage**
Building only the necessary amenities.
- Energy efficiency**
Building a well performing house saves money for the regular operating cost, and keeps systems small and affordable.

BUDGET

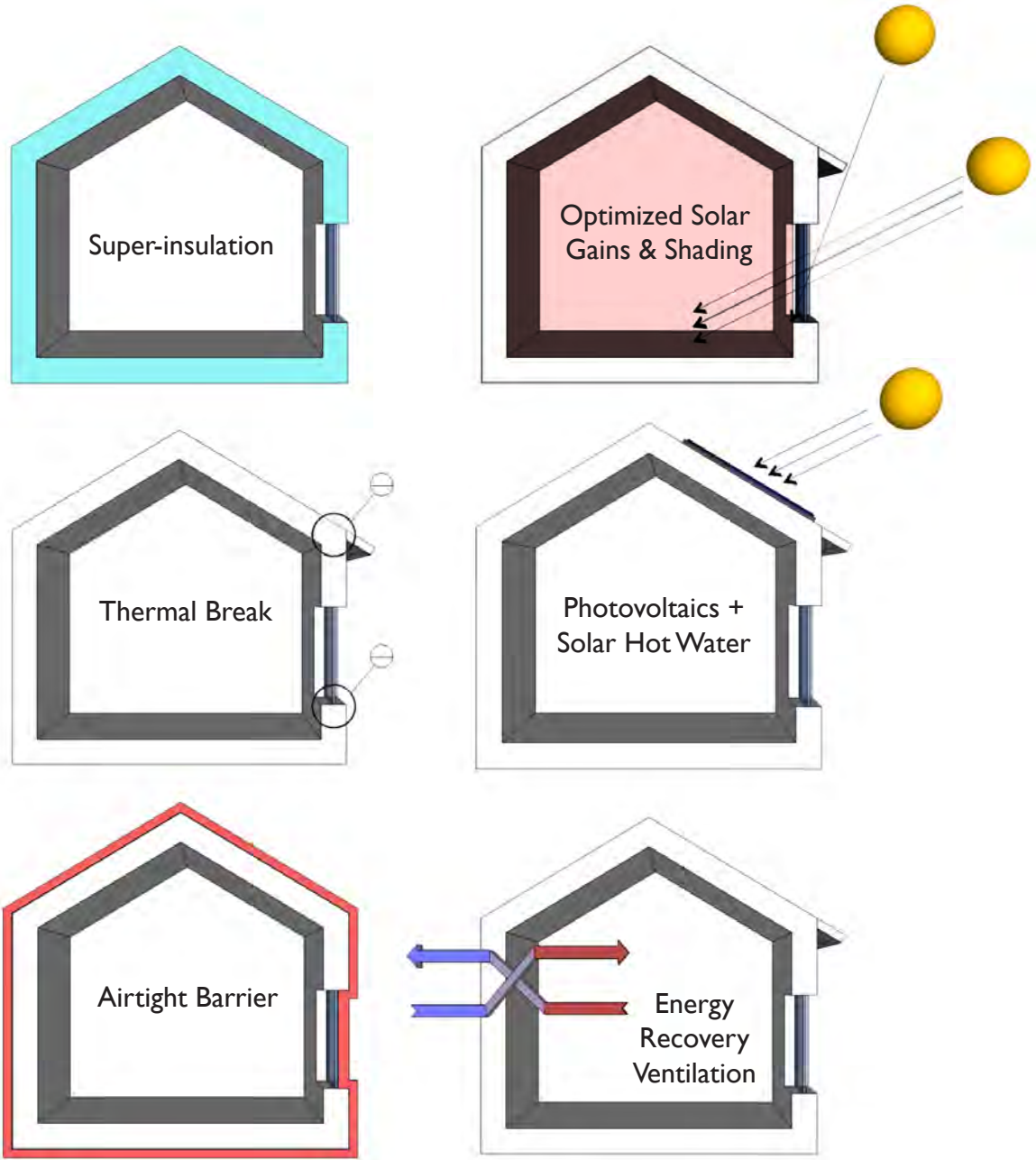
By implementing these design strategies, cost can be lowered to \$150 per SF

CONSTRUCTION COST	UNIT 1: (700 SF)	UNIT 2: (830 SF)	UNIT 3: (1000 SF)
Site work, excavation, water, sewer	\$9,000	\$11,000	\$15,000
Foundation, footings, insulation	\$10,000	\$12,000	\$10,000
Rough framing, trusses, sheathing	\$18,000	\$23,000	\$27,000
Insulation and air sealing	\$5,000	\$6,000	\$8,000
Roofing, siding	\$6,000	\$8,000	\$10,000
Windows, exterior doors	\$7,000	\$8,000	\$15,000
Electrical, plumbing	\$12,000	\$14,000	\$18,000
ERV, Solar hot water, Heat pump	\$8,000	\$8,000	\$10,000
Drywall, priming, paint	\$6,000	\$8,000	\$10,000
Finishes, Interior doors, lighting	\$10,000	\$12,000	\$14,000
Bathroom, kitchen	\$9,000	\$10,000	\$12,000
TOTALS:	\$100,000	\$120,000	\$150,000



PASSIVE HOUSE PRINCIPLES

1. Super Insulated Building Envelope
- The 12" double stud wall filled with dense pack Cellulose will create a R-46 super insulated wall. The slab will be insulated to R-30 and the roof to R-76.
2. Thermally broken wall assembly
- Connections are detailed to minimize thermal bridges to reduce heat loss through the building components.
3. Continuous Airtight Boundary
- Careful air sealing will aim to achieve an airtightness of 0.6 ACH @ 50 Pa. This combined with the ERV creates a draft free but very comfortable space with high air quality.
4. Optimized Solar Gains and Shading
- Optimized solar shading will allow low winter sun into the space to keep the space warm, but prevent high summer sun from overheating the rooms. With the help of triple pane windows with high Solar Heat Gain Coefficients and Low U-Values.
5. Energy Recovery Ventilation
- The Energy Recovery Ventilator has a high 96% efficiency, which means incoming fresh air is heated by outgoing air to at least 50°F, even when the outside air temperature is below zero. This allows for significant energy savings.
6. Photovoltaic Renewable Energy
- A grid-tied PV system on each unit will allow for financial and carbon payback for the homeowner. Solar hot water will significantly reduce the Domestic Hot Water Load.



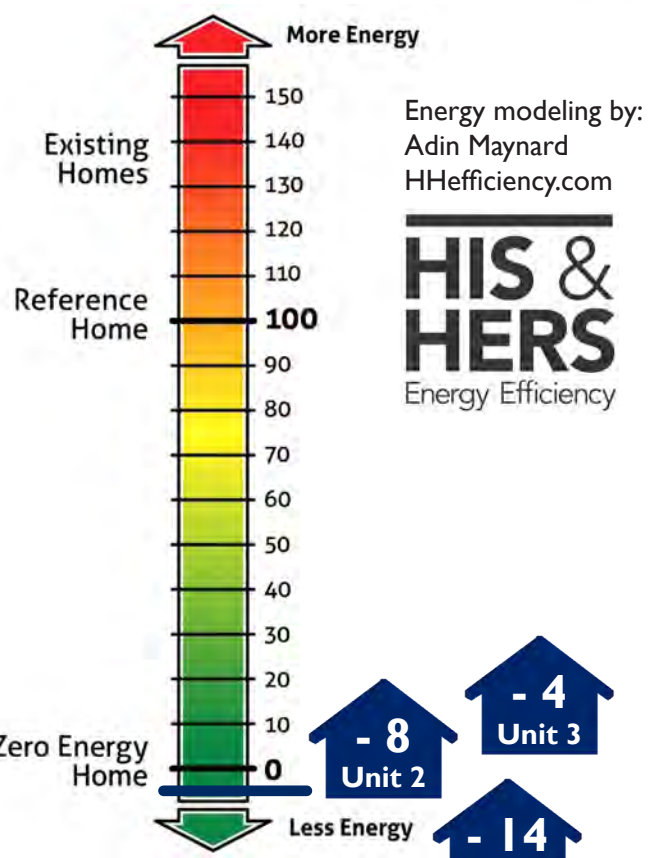
ENERGY PERFORMANCE

HERS Rating: (Home Energy Rating System)	Unit 1:	Unit 2:	Unit 3:
HERS Index:	-14	-8	-4
HERS Index without PV:	35	33	33
Annual Savings*:	\$2,986	\$3,547	\$3,859
Estimated Annual Energy Cost:	\$60	\$60	\$60
Net Annual Consumption:	-2,093 kWh	-1,606 kWh	-792 kWh
Heating Design Load:	6 kBtu/hr	7 kBtu/hr	10 kBtu/hr
Cooling Design Load:	5 kBtu/hr	5 kBtu/hr	7 kBtu/hr
Annual CO2 Emissions:	-5.4 Tons	-5.1 Tons	-4.4 Tons
Trees to Offset:	-379	-357	-306
Mass Save rebate (2018):	\$2,943	\$3,335	\$4,634

* Relative to an average US home.

ENERGY EFFICIENT SYSTEMS

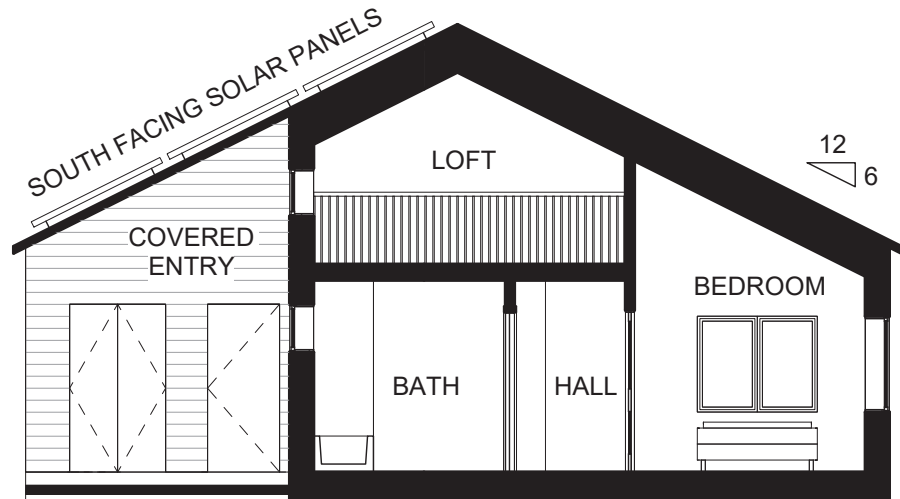
- Units 1 & 2 Solar Array- LG 330
- Total of 36 PV panels
- + 4 solar hot water panels
- Unit 1 - 18 panels - 6 kw system
- Unit 2 - 18 panels - 6 kw system
- Unit 3 Solar Array- LG 330
- Total of 15 PV panels - 5 kw system
- + 2 solar hot water panels
- Heat Pump: Mitsubishi / Fujitsu Minisplit, single head
- Energy Recovery Ventilator: Zehnder Comfo air 200 ERV / Venmar AVS k7 ERV
- Solar hot water heater: Sunearth panels w/ HTP 50 gal. Tank
- Energy Star appliances
- Water saving 0.8 gal. Per flush toilets
- LED lighting



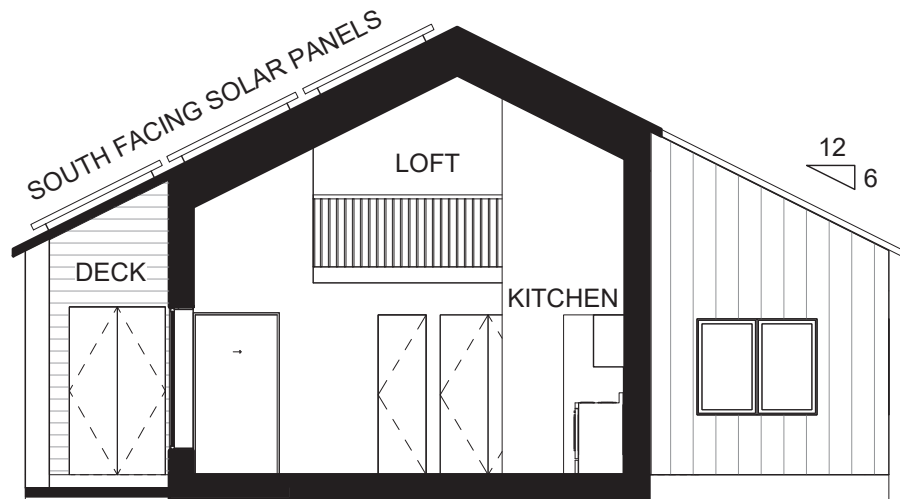
SOUTH
UNIT 1 & 2 EXTERIOR ELEVATIONS
1/8" = 1'-0"



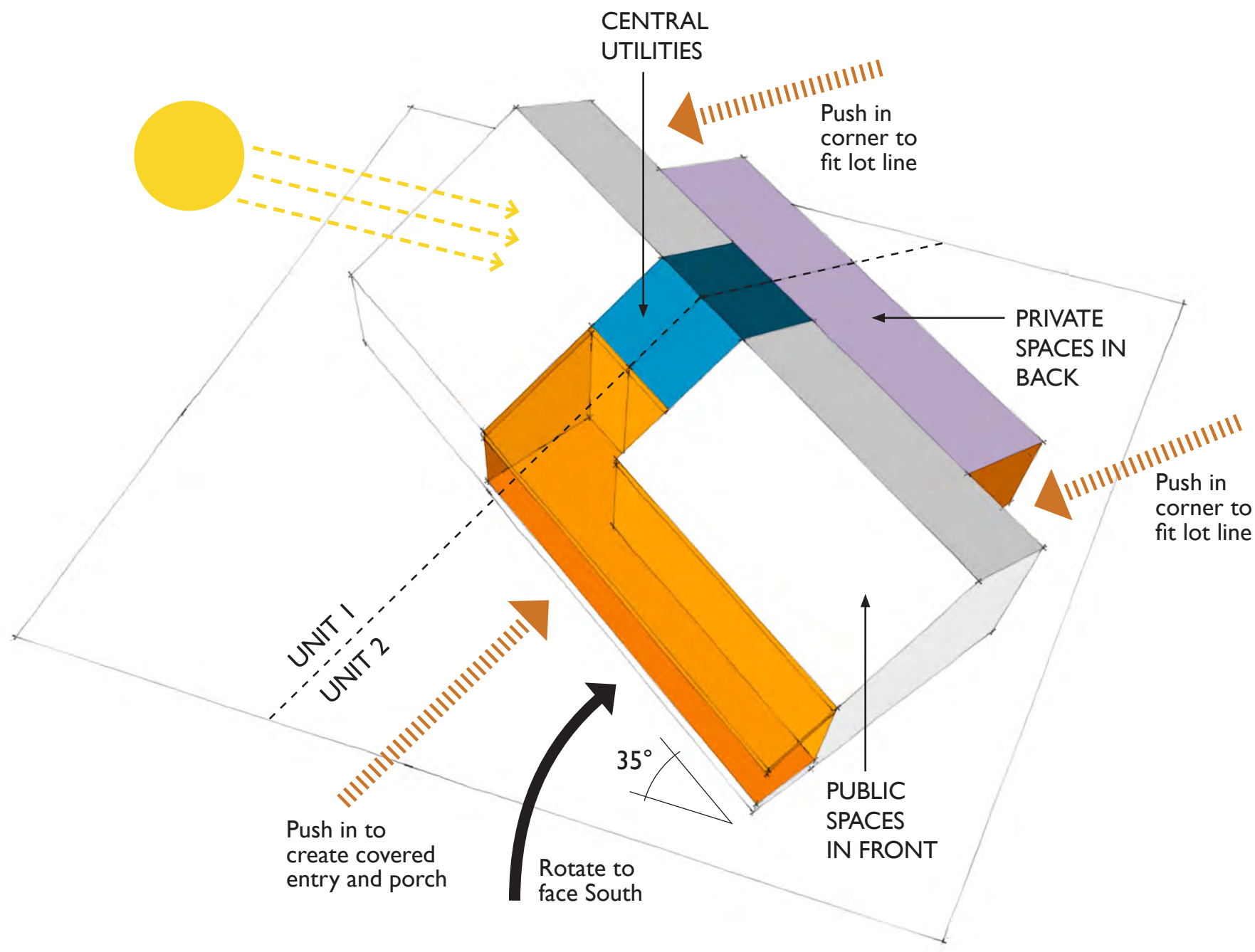
EAST



UNIT 1 BUILDING SECTION
1/8" = 1'-0"



UNIT 2 BUILDING SECTION
1/8" = 1'-0"



UNIT 1 & 2 FIRST FLOOR PLAN
1/4" = 1'-0"

